SEQUENCE LISTING

<110> Cao, Wei-Qiang

<120> HAIR CELL DISORDERS

<130> GENENT.035C1

<140> US 09/849,868
<141> 2001-05-04

<150> US 60/107,522
<151> 1998-11-07

<150> PCT/US99/25744
<151> 1999-10-28

<160> 14

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 669
<212> PRT
<213> Homo sapiens

<400> 1

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Leu Phe Pro Asn Pro Ile Arg Ala Leu Gly Pro Asn Ser Pro Ala Pro
            20                  25                  30
Arg Ala Val Arg Val Glu Arg Ser Val Ser Gly Glu Met Ser Glu Arg
        35                  40                  45
Lys Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys Glu Arg Gly Ser
    50                  55                  60
Gly Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser Pro Ala Leu Pro
65                  70                  75                  80
Pro Arg Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala Gly Ser Lys
                85                  90                  95
Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser Leu Arg Phe
            100                 105                 110
Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys Asn Lys Pro Gln
        115                 120                 125
Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu Arg Ile Asn
    130                 135                 140
Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys Val Ile Ser
145                 150                 155                 160
Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr Ile Val Glu Ser
                165                 170                 175
Asn Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu Gly Ala Tyr Val
            180                 185                 190
Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr Glu Gly Ala Asn
        195                 200                 205
```

Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser His Leu Val
210 215 220
Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn Gly Gly Glu Cys
225 230 235 240
Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr Leu Cys Lys Cys
245 250 255
Gln Pro Gly Phe Thr Gly Ala Arg Cys Thr Glu Asn Val Pro Met Lys
260 265 270
Val Gln Asn Gln Glu Lys Ala Glu Glu Leu Tyr Gln Lys Arg Val Leu
275 280 285
Thr Ile Thr Gly Ile Cys Ile Ala Leu Leu Val Val Gly Ile Met Cys
290 295 300
Val Val Ala Tyr Cys Lys Thr Lys Lys Gln Arg Lys Lys Leu His Asp
305 310 315 320
Arg Leu Arg Gln Ser Leu Arg Ser Glu Arg Asn Asn Met Met Asn Ile
325 330 335
Ala Asn Gly Pro His His Pro Asn Pro Pro Pro Glu Asn Val Gln Leu
340 345 350
Val Asn Gln Tyr Val Ser Lys Asn Val Ile Ser Ser Glu His Ile Val
355 360 365
Glu Arg Glu Ala Glu Thr Ser Phe Ser Thr Ser His Tyr Thr Ser Thr
370 375 380
Ala His His Ser Thr Thr Val Thr Gln Thr Pro Ser His Ser Trp Ser
385 390 395 400
Asn Gly His Thr Glu Ser Ile Leu Ser Glu Ser His Ser Val Ile Val
405 410 415
Met Ser Ser Val Glu Asn Ser Arg His Ser Ser Pro Thr Gly Gly Pro
420 425 430
Arg Gly Arg Leu Asn Gly Thr Gly Gly Pro Arg Glu Cys Asn Ser Phe
435 440 445
Leu Arg His Ala Arg Glu Thr Pro Asp Ser Tyr Arg Asp Ser Pro His
450 455 460
Ser Glu Arg Tyr Val Ser Ala Met Thr Thr Pro Ala Arg Met Ser Pro
465 470 475 480
Val Asp Phe His Thr Pro Ser Ser Pro Lys Ser Pro Pro Ser Glu Met
485 490 495
Ser Pro Pro Val Ser Ser Met Thr Val Ser Met Pro Ser Met Ala Val
500 505 510
Ser Pro Phe Met Glu Glu Glu Arg Pro Leu Leu Leu Val Thr Pro Pro
515 520 525
Arg Leu Arg Glu Lys Lys Phe Asp His His Pro Gln Gln Phe Ser Ser
530 535 540
Phe His His Asn Pro Ala His Asp Ser Asn Ser Leu Pro Ala Ser Pro
545 550 555 560
Leu Arg Ile Val Glu Asp Glu Glu Tyr Glu Thr Thr Gln Glu Tyr Glu
565 570 575
Pro Ala Gln Glu Pro Val Lys Lys Leu Ala Asn Ser Arg Arg Ala Lys
580 585 590
Arg Thr Lys Pro Asn Gly His Ile Ala Asn Arg Leu Glu Val Asp Ser
595 600 605
Asn Thr Ser Ser Gln Ser Ser Asn Ser Glu Ser Glu Thr Glu Asp Glu
610 615 620
Arg Val Gly Glu Asp Thr Pro Phe Leu Gly Ile Gln Asn Pro Leu Ala
625 630 635 640
Ala Ser Leu Glu Ala Thr Pro Ala Phe Arg Leu Ala Asp Ser Arg Thr

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                645                 650                 655
Asn Pro Ala Gly Arg Phe Ser Thr Gln Glu Glu Ile Gln
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<220>
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<222> (2)...(2008)

<400> 2

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  Gly Ala Ser Ala Ser Ala Arg Pro Leu Ala Leu Pro Leu Glu Gly Gln
   1               5                  10                  15

act ttt ccc aaa ccc gat ccg agc cct tgg acc aaa ctc gcc tgc gcc   97
Thr Phe Pro Lys Pro Asp Pro Ser Pro Trp Thr Lys Leu Ala Cys Ala
            20                  25                  30

gag agc cgt ccg cgt aga gcg ctc cgt ctc cgg cga gat gtc cga gcg   145
Glu Ser Arg Pro Arg Arg Ala Leu Arg Leu Arg Arg Asp Val Arg Ala
         35                  40                  45

caa aga agg cag agg caa agg gaa ggg caa gaa gaa gga gcg agg ctc   193
Gln Arg Arg Gln Arg Gln Arg Glu Gly Gln Glu Glu Gly Ala Arg Leu
     50                  55                  60

cgg caa gaa gcc gga gtc cgc ggc ggg cag cca gag ccc agc ctt gcc   241
Arg Gln Glu Ala Gly Val Arg Gly Gly Gln Pro Glu Pro Ser Leu Ala
 65                  70                  75                  80

tcc ccg att gaa aga gat gaa aag cca gga atc ggc tgc agg ttc caa   289
Ser Pro Ile Glu Arg Asp Glu Lys Pro Gly Ile Gly Cys Arg Phe Gln
                85                  90                  95

act agt cct tcg gtg tga aac cag ttc tga ata ctc ctc tct cag att   337
Thr Ser Pro Ser Val  *  Asn Gln Phe  *  Ile Leu Leu Ser Gln Ile
            100                 105                 110

caa gtg gtt caa gaa tgg gaa tga att gaa tcg aaa aaa caa acc aca   385
Gln Val Val Gln Glu Trp Glu  *  Ile Glu Ser Lys Lys Gln Thr Thr
                115                 120                 125

aaa tat caa gat aca aaa aaa gcc agg gaa gtc aga act tcg cat taa   433
Lys Tyr Gln Asp Thr Lys Lys Ala Arg Glu Val Arg Thr Ser His  *
                130                 135                 140

caa agc atc act ggc tga ttc tgg aga gta tat gtg caa agt gat cag   481
Gln Ser Ile Thr Gly  *  Phe Trp Arg Val Tyr Val Gln Ser Asp Gln
                145                 150                 155
```

```
caa att agg aaa tga cag tgc ctc tgc caa tat cac cat cgt gga atc   529
Gln Ile Arg Lys  *  Gln Cys Leu Cys Gln Tyr His His Arg Gly Ile
                   160                 165                 170

aaa cga gat cat cac tgg tat gcc agc ctc aac tga agg agc ata tgt   577
Lys Arg Asp His His Trp Tyr Ala Ser Leu Asn  *  Arg Ser Ile Cys
               175                 180                 185

gtc ttc aga gtc tcc cat tag aat atc agt atc cac aga agg agc aaa   625
Val Phe Arg Val Ser His  *  Asn Ile Ser Ile His Arg Arg Ser Lys
               190                 195                 200

tac ttc ttc atc tac atc tac atc cac cac tgg gac aag cca tct tgt   673
Tyr Phe Phe Ile Tyr Ile Tyr Ile His His Trp Asp Lys Pro Ser Cys
               205                 210                 215

aaa atg tgc gga gaa gga gaa aac ttt ctg tgt gaa tgg agg gga gtg   721
Lys Met Cys Gly Glu Gly Glu Asn Phe Leu Cys Glu Trp Arg Gly Val
           220                 225                 230

ctt cat ggt gaa aga cct ttc aaa ccc ctc gag ata ctt gtg caa gtg   769
Leu His Gly Glu Arg Pro Phe Lys Pro Leu Glu Ile Leu Val Gln Val
       235                 240                 245

cca acc tgg att cac tgg agc aag atg tac tga gaa tgt gcc cat gaa   817
Pro Thr Trp Ile His Trp Ser Lys Met Tyr  *  Glu Cys Ala His Glu
   250                 255                 260

agt cca aaa cca aga aaa ggc gga gga gct gta cca gaa gag agt gct   865
Ser Pro Lys Pro Arg Lys Gly Gly Gly Ala Val Pro Glu Glu Ser Ala
   265                 270                 275

gac cat aac cgg cat ctg cat cgc cct cct tgt ggt cgg cat cat gtg   913
Asp His Asn Arg His Leu His Arg Pro Pro Cys Gly Arg His His Val
280                 285                 290                 295

tgt ggt ggc cta ctg caa aac caa gaa aca gcg gaa aaa gct gca tga   961
Cys Gly Gly Leu Leu Gln Asn Gln Glu Thr Ala Glu Lys Ala Ala  *
               300                 305                 310

ccg tct tcg gca gag cct tcg gtc tga acg aaa caa tat gat gaa cat   1009
Pro Ser Ser Ala Glu Pro Ser Val  *  Thr Lys Gln Tyr Asp Glu His
               315                 320                 325

tgc caa tgg gcc tca cca tcc taa ccc acc ccc cga gaa tgt cca gct   1057
Cys Gln Trp Ala Ser Pro Ser  *  Pro Thr Pro Arg Glu Cys Pro Ala
               330                 335                 340

ggt gaa tca ata cgt atc taa aaa cgt cat ctc cag tga gca tat tgt   1105
Gly Glu Ser Ile Arg Ile  *  Lys Arg His Leu Gln  *  Ala Tyr Cys
               345                 350

tga gag aga agc aga gac atc ctt ttc cac cag tca cta tac ttc cac   1153
 *  Glu Arg Ser Arg Asp Ile Leu Phe His Gln Ser Leu Tyr Phe His
   355                 360                 365
```

```
agc cca tca ctc cac tac tgt cac cca gac tcc tag cca cag ctg gag   1201
Ser Pro Ser Leu His Tyr Cys His Pro Asp Ser  *  Pro Gln Leu Glu
370                 375                 380

caa cgg aca cac tga aag cat cct ttc cga aag cca ctc tgt aat cgt   1249
Gln Arg Thr His  *  Lys His Pro Phe Arg Lys Pro Leu Cys Asn Arg
385                     390                 395

gat gtc atc cgt aga aaa cag tag gca cag cag ccc aac tgg ggg ccc   1297
Asp Val Ile Arg Arg Lys Gln  *  Ala Gln Gln Pro Asn Trp Gly Pro
400                 405                 410

aag agg acg tct taa tgg cac agg agg ccc tcg tga atg taa cag ctt   1345
Lys Arg Thr Ser  *  Trp His Arg Arg Pro Ser  *  Met  *  Gln Leu
415                     420                     425

cct cag gca tgc cag aga aac ccc tga ttc cta ccg aga ctc tcc tca   1393
Pro Gln Ala Cys Gln Arg Asn Pro  *  Phe Leu Pro Arg Leu Ser Ser
        430                 435                     440

tag tga aag gta tgt gtc agc cat gac cac ccc ggc tcg tat gtc acc   1441
 *   *  Lys Val Cys Val Ser His Asp His Pro Gly Ser Tyr Val Thr
               445                 450                 455

tgt aga ttt cca cac gcc aag ctc ccc caa atc gcc ccc ttc gga aat   1489
Cys Arg Phe Pro His Ala Lys Leu Pro Gln Ile Ala Pro Phe Gly Asn
            460                 465                 470

gtc tcc acc cgt gtc cag cat gac ggt gtc cat gcc ttc cat ggc ggt   1537
Val Ser Thr Arg Val Gln His Asp Gly Val His Ala Phe His Gly Gly
        475                 480                 485

cag ccc ctt cat gga aga aga gag acc tct act tct cgt gac acc acc   1585
Gln Pro Leu His Gly Arg Arg Glu Thr Ser Thr Ser Arg Asp Thr Thr
    490                 495                 500

aag gct gcg gga gaa gaa gtt tga cca tca ccc tca gca gtt cag ctc   1633
Lys Ala Ala Gly Glu Glu Val  *  Pro Ser Pro Ser Ala Val Gln Leu
505                 510                 515

ctt cca cca caa ccc cgc gca tga cag taa cag cct ccc tgc tag ccc   1681
Leu Pro Pro Gln Pro Arg Ala  *  Gln  *  Gln Pro Pro Cys  *  Pro
520                 525                 530

ctt gag gat agt gga gga tga gga gta tga aac gac cca aga gta cga   1729
Leu Glu Asp Ser Gly Gly  *  Gly Val  *  Asn Asp Pro Arg Val Arg
        535                 540                 545

gcc agc cca aga gcc tgt taa gaa act cgc caa tag ccg gcg ggc caa   1777
Ala Ser Pro Arg Ala Cys  *  Glu Thr Arg Gln  *  Pro Ala Gly Gln
            550                 555                 560

aag aac caa gcc caa tgg cca cat tgc taa cag att gga agt gga cag   1825
Lys Asn Gln Ala Gln Trp Pro His Cys  *  Gln Ile Gly Ser Gly Gln
```

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                565                 570                 575

caa cac aag ctc cca gag cag taa ctc aga gag tga aac aga aga tga   1873
Gln His Lys Leu Pro Glu Gln  *  Leu Arg Glu  *  Asn Arg Arg  *
                580                 585

aag agt agg tga aga tac gcc ttt cct ggg cat aca gaa ccc cct ggc   1921
Lys Ser Arg  *  Arg Tyr Ala Phe Pro Gly His Thr Glu Pro Pro Gly
    590                 595                 600

agc cag tct tga ggc aac acc tgc ctt ccg cct ggc tga cag cag gac   1969
Ser Gln Ser  *  Gly Asn Thr Cys Leu Pro Pro Gly  *  Gln Gln Asp
    605                 610                 615

taa ccc agc agg ccg ctt ctc gac aca gga aga aat cca ggccaggctg    2018
 *  Pro Ser Arg Pro Leu Leu Asp Thr Gly Arg Asn Pro
           620                 625

tctagtgtaa ttgctaacca agaccctatt gctgtataaa acctaaataa acacatagat 2078
tcacctgtaa aactttattt tatataataa agtattccac cttaaattaa acaatttatt 2138
ttattttagc agttctgcaa atagaaaaca ggaaaaaaac ttttataaat taaatatatg 2198
tatgtaaaaa tgaaaaaaaa aaaaaaaa                                    2226
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<210> 3
<211> 675
<212> PRT
<213> Homo sapiens

<400> 3

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Asp Lys Leu Phe Pro Asn Pro Ile Arg Ala Leu Gly Pro Asn Ser Pro
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Ala Pro Arg Ala Val Arg Val Glu Arg Ser Val Ser Gly Glu Met Ser
            20                  25                  30
Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys Glu Arg
        35                  40                  45
Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser Pro Ala
    50                  55                  60
Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala Gly
65                  70                  75                  80
Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser Leu
                85                  90                  95
Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys Asn Lys
            100                 105                 110
Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu Arg
        115                 120                 125
Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys Val
    130                 135                 140
Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr Ile Val
145                 150                 155                 160
Glu Ser Asn Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu Gly Ala
                165                 170                 175
Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr Glu Gly
            180                 185                 190
Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser His
        195                 200                 205
```

Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn Gly Gly
210 215 220
Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr Leu Cys
225 230 235 240
Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr Val Met
245 250 255
Ala Ser Phe Tyr Lys His Leu Gly Ile Glu Phe Met Glu Ala Glu Glu
260 265 270
Leu Tyr Gln Lys Arg Val Leu Thr Ile Thr Gly Ile Cys Ile Ala Leu
275 280 285
Leu Val Val Gly Ile Met Cys Val Val Ala Tyr Cys Lys Thr Lys Lys
290 295 300
Gln Arg Lys Lys Leu His Asp Arg Leu Arg Gln Ser Leu Arg Ser Glu
305 310 315 320
Arg Asn Asn Met Met Asn Ile Ala Asn Gly Pro His His Pro Asn Pro
325 330 335
Pro Pro Glu Asn Val Gln Leu Val Asn Gln Tyr Val Ser Lys Asn Val
340 345 350
Ile Ser Ser Glu His Ile Val Glu Arg Glu Ala Glu Thr Ser Phe Ser
355 360 365
Thr Ser His Tyr Thr Ser Thr Ala His His Ser Thr Thr Val Thr Gln
370 375 380
Thr Pro Ser His Ser Trp Ser Asn Gly His Thr Glu Ser Ile Leu Ser
385 390 395 400
Glu Ser His Ser Val Ile Val Met Ser Ser Val Glu Asn Ser Arg His
405 410 415
Ser Ser Pro Thr Gly Gly Pro Arg Gly Arg Leu Asn Gly Thr Gly Gly
420 425 430
Pro Arg Glu Cys Asn Ser Phe Leu Arg His Ala Arg Glu Thr Pro Asp
435 440 445
Ser Tyr Arg Asp Ser Pro His Ser Glu Arg Tyr Val Ser Ala Met Thr
450 455 460
Thr Pro Ala Arg Met Ser Pro Val Asp Phe His Thr Pro Ser Ser Pro
465 470 475 480
Lys Ser Pro Pro Ser Glu Met Ser Pro Pro Val Ser Ser Met Thr Val
485 490 495
Ser Met Pro Ser Met Ala Val Ser Pro Phe Met Glu Glu Glu Arg Pro
500 505 510
Leu Leu Leu Val Thr Pro Pro Arg Leu Arg Glu Lys Lys Phe Asp His
515 520 525
His Pro Gln Gln Phe Ser Ser Phe His His Asn Pro Ala His Asp Ser
530 535 540
Asn Ser Leu Pro Ala Ser Pro Leu Arg Ile Val Glu Asp Glu Glu Tyr
545 550 555 560
Glu Thr Thr Gln Glu Tyr Glu Pro Ala Gln Glu Pro Val Lys Lys Leu
565 570 575
Ala Asn Ser Arg Arg Ala Lys Arg Thr Lys Pro Asn Gly His Ile Ala
580 585 590
Asn Arg Leu Glu Val Asp Ser Asn Thr Ser Ser Gln Ser Ser Asn Ser
595 600 605
Glu Ser Glu Thr Glu Asp Glu Arg Val Gly Glu Asp Thr Pro Phe Leu
610 615 620
Gly Ile Gln Asn Pro Leu Ala Ala Ser Leu Glu Ala Thr Pro Ala Phe
625 630 635 640
Arg Leu Ala Asp Ser Arg Thr Asn Pro Ala Gly Arg Phe Ser Thr Gln

```
                645                 650                 655
Glu Glu Ile Gln Ala Arg Leu Ser Ser Val Ile Ala Asn Gln Asp Pro
            660                 665                 670
Ile Ala Val
        675
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<210> 4
<211> 2199
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (3)...(2027)

<400> 4

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gg gac aaa ctt ttc cca aac ccg atc cga gcc ctt gga cca aac tcg    47
   Asp Lys Leu Phe Pro Asn Pro Ile Arg Ala Leu Gly Pro Asn Ser
    1               5                  10                  15

cct gcg ccg aga gcc gtc cgc gta gag cgc tcc gtc tcc ggc gag atg   95
Pro Ala Pro Arg Ala Val Arg Val Glu Arg Ser Val Ser Gly Glu Met
                20                  25                  30

tcc gag cgc aaa gaa ggc aga ggc aaa ggg aag ggc aag aag aag gag   143
Ser Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys Glu
            35                  40                  45

cga ggc tcc ggc aag aag ccg gag tcc gcg gcg ggc agc cag agc cca   191
Arg Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser Pro
        50                  55                  60

gcc ttg cct ccc caa ttg aaa gag atg aaa agc cag gaa tcg gct gca   239
Ala Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala
    65                  70                  75

ggt tcc aaa cta gtc ctt cgg tgt gaa acc agt tct gaa tac tcc tct   287
Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser
80                  85                  90                  95

ctc aga ttc aag tgg ttc aag aat ggg aat gaa ttg aat cga aaa aac   335
Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys Asn
                100                 105                 110

aaa cca caa aat atc aag ata caa aaa aag cca ggg aag tca gaa ctt   383
Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu
            115                 120                 125

cgc att aac aaa gca tca ctg gct gat tct gga gag tat atg tgc aaa   431
Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys
        130                 135                 140

gtg atc agc aaa tta gga aat gac agt gcc tct gcc aat atc acc atc   479
Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr Ile
```

```
    145                 150                 155

gtg gaa tca aac gag atc atc act ggt atg cca gcc tca act gaa gga   527
Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu Gly
160                 165                 170                 175

gca tat gtg tct tca gag tct ccc att aga ata tca gta tcc aca gaa   575
Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr Glu
                180                 185                 190

gga gca aat act tct tca tct aca tct aca tcc acc act ggg aca agc   623
Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser
            195                 200                 205

cat ctt gta aaa tgt gcg gag aag gag aaa act ttc tgt gtg aat gga   671
His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn Gly
        210                 215                 220

ggg gag tgc ttc atg gtg aaa gac ctt tca aac ccc tcg aga tac ttg   719
Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr Leu
    225                 230                 235

tgc aag tgc cca aat gag ttt act ggt gat cgc tgc caa aac tac gta   767
Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr Val
240                 245                 250                 255

atg gcc agc ttc tac aag cat ctt ggg att gaa ttt atg gag gcg gag   815
Met Ala Ser Phe Tyr Lys His Leu Gly Ile Glu Phe Met Glu Ala Glu
                260                 265                 270

gag ctg tac cag aag aga gtg ctg acc ata acc ggc atc tgc atc gcc   863
Glu Leu Tyr Gln Lys Arg Val Leu Thr Ile Thr Gly Ile Cys Ile Ala
            275                 280                 285

ctc ctt gtg gtc ggc atc atg tgt gtg gtg gcc tac tgc aaa acc aag   911
Leu Leu Val Val Gly Ile Met Cys Val Val Ala Tyr Cys Lys Thr Lys
        290                 295                 300

aaa cag cgg aaa aag ctg cat gac cgt ctt cgg cag agc ctt cgg tct   959
Lys Gln Arg Lys Lys Leu His Asp Arg Leu Arg Gln Ser Leu Arg Ser
    305                 310                 315

gaa cga aac aat atg atg aac att gcc aat ggg cct cac cat cct aac   1007
Glu Arg Asn Asn Met Met Asn Ile Ala Asn Gly Pro His His Pro Asn
320                 325                 330                 335

cca ccc ccc gag aat gtc cag ctg gtg aat caa tac gta tct aaa aac   1055
Pro Pro Pro Glu Asn Val Gln Leu Val Asn Gln Tyr Val Ser Lys Asn
                340                 345                 350

gtc atc tcc agt gag cat att gtt gag aga gaa gca gag aca tcc ttt   1103
Val Ile Ser Ser Glu His Ile Val Glu Arg Glu Ala Glu Thr Ser Phe
            355                 360                 365

tcc acc agt cac tat act tcc aca gcc cat cac tcc act act gtc acc   1151
```

```
Ser Thr Ser His Tyr Thr Ser Thr Ala His His Ser Thr Thr Val Thr
        370                 375                 380

cag act cct agc cac agc tgg agc aac gga cac act gaa agc atc ctt   1199
Gln Thr Pro Ser His Ser Trp Ser Asn Gly His Thr Glu Ser Ile Leu
    385                 390                 395

tcc gaa agc cac tct gta atc gtg atg tca tcc gta gaa aac agt agg   1247
Ser Glu Ser His Ser Val Ile Val Met Ser Ser Val Glu Asn Ser Arg
400                 405                 410                 415

cac agc agc cca act ggg ggc cca aga gga cgt ctt aat ggc aca gga   1295
His Ser Ser Pro Thr Gly Gly Pro Arg Gly Arg Leu Asn Gly Thr Gly
                420                 425                 430

ggc cct cgt gaa tgt aac agc ttc ctc agg cat gcc aga gaa acc cct   1343
Gly Pro Arg Glu Cys Asn Ser Phe Leu Arg His Ala Arg Glu Thr Pro
            435                 440                 445

gat tcc tac cga gac tct cct cat agt gaa agg tat gtg tca gcc atg   1391
Asp Ser Tyr Arg Asp Ser Pro His Ser Glu Arg Tyr Val Ser Ala Met
        450                 455                 460

acc acc ccg gct cgt atg tca cct gta gat ttc cac acg cca agc tcc   1439
Thr Thr Pro Ala Arg Met Ser Pro Val Asp Phe His Thr Pro Ser Ser
    465                 470                 475

ccc aaa tcg ccc cct tcg gaa atg tct cca ccc gtg tcc agc atg acg   1487
Pro Lys Ser Pro Pro Ser Glu Met Ser Pro Pro Val Ser Ser Met Thr
480                 485                 490                 495

gtg tcc atg cct tcc atg gcg gtc agc ccc ttc atg gaa gaa gag aga   1535
Val Ser Met Pro Ser Met Ala Val Ser Pro Phe Met Glu Glu Glu Arg
                500                 505                 510

cct cta ctt ctc gtg aca cca cca agg ctg cgg gag aag aag ttt gac   1583
Pro Leu Leu Leu Val Thr Pro Pro Arg Leu Arg Glu Lys Lys Phe Asp
            515                 520                 525

cat cac cct cag cag ttc agc tcc ttc cac cac aac ccc gcg cat gac   1631
His His Pro Gln Gln Phe Ser Ser Phe His His Asn Pro Ala His Asp
        530                 535                 540

agt aac agc ctc cct gct agc ccc ttg agg ata gtg gag gat gag gag   1679
Ser Asn Ser Leu Pro Ala Ser Pro Leu Arg Ile Val Glu Asp Glu Glu
    545                 550                 555

tat gaa acg acc caa gag tac gag cca gcc caa gag cct gtt aag aaa   1727
Tyr Glu Thr Thr Gln Glu Tyr Glu Pro Ala Gln Glu Pro Val Lys Lys
560                 565                 570                 575

ctc gcc aat agc cgg cgg gcc aaa aga acc aag ccc aat ggc cac att   1775
Leu Ala Asn Ser Arg Arg Ala Lys Arg Thr Lys Pro Asn Gly His Ile
                580                 585                 590
```

```
gct aac aga ttg gaa gtg gac agc aac aca agc tcc cag agc agt aac   1823
Ala Asn Arg Leu Glu Val Asp Ser Asn Thr Ser Ser Gln Ser Ser Asn
            595                 600                 605

tca gag agt gaa aca gaa gat gaa aga gta ggt gaa gat acg cct ttc   1871
Ser Glu Ser Glu Thr Glu Asp Glu Arg Val Gly Glu Asp Thr Pro Phe
        610                 615                 620

ctg ggc ata cag aac ccc ctg gca gcc agt ctt gag gca aca cct gcc   1919
Leu Gly Ile Gln Asn Pro Leu Ala Ala Ser Leu Glu Ala Thr Pro Ala
    625                 630                 635

ttc cgc ctg gct gac agc agg act aac cca gca ggc cgc ttc tcg aca   1967
Phe Arg Leu Ala Asp Ser Arg Thr Asn Pro Ala Gly Arg Phe Ser Thr
640                 645                 650                 655

cag gaa gaa atc cag gcc agg ctg tct agt gta att gct aac caa gac   2015
Gln Glu Glu Ile Gln Ala Arg Leu Ser Ser Val Ile Ala Asn Gln Asp
                660                 665                 670

cct att gct gta taaaacctaa ataaacacat agattcacct gtaaaacttt       2067
Pro Ile Ala Val
            675

attttatata ataaagtatt ccaccttaaa ttaaacaatt tattttattt tagcagttct 2127
gcaaatagaa aacaggaaaa aaacttttat aaattaaata tatgtatgta aaaatgaaaa 2187
aaaaaaaaaa aa                                                    2199

<210> 5
<211> 637
<212> PRT
<213> Homo sapiens

<400> 5
Met Ser Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys
 1               5                  10                  15
Glu Arg Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser
            20                  25                  30
Pro Ala Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala
        35                  40                  45
Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser
    50                  55                  60
Ser Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys
65                  70                  75                  80
Asn Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu
                85                  90                  95
Leu Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys
            100                 105                 110
Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr
        115                 120                 125
Ile Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu
    130                 135                 140
Gly Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr
145                 150                 155                 160
Glu Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr
```

```
                 165                 170                 175
Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn
             180                 185                 190
Gly Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr
         195                 200                 205
Leu Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr
     210                 215                 220
Val Met Ala Ser Phe Tyr Lys Ala Glu Glu Leu Tyr Gln Lys Arg Val
225                 230                 235                 240
Leu Thr Ile Thr Gly Ile Cys Ile Ala Leu Leu Val Val Gly Ile Met
                 245                 250                 255
Cys Val Val Ala Tyr Cys Lys Thr Lys Lys Gln Arg Lys Lys Leu His
             260                 265                 270
Asp Arg Leu Arg Gln Ser Leu Arg Ser Glu Arg Asn Asn Met Met Asn
         275                 280                 285
Ile Ala Asn Gly Pro His His Pro Asn Pro Pro Pro Glu Asn Val Gln
     290                 295                 300
Leu Val Asn Gln Tyr Val Ser Lys Asn Val Ile Ser Ser Glu His Ile
305                 310                 315                 320
Val Glu Arg Glu Ala Glu Thr Ser Phe Ser Thr Ser His Tyr Thr Ser
                 325                 330                 335
Thr Ala His His Ser Thr Thr Val Thr Gln Thr Pro Ser His Ser Trp
             340                 345                 350
Ser Asn Gly His Thr Glu Ser Ile Leu Ser Glu Ser His Ser Val Ile
         355                 360                 365
Val Met Ser Ser Val Glu Asn Ser Arg His Ser Ser Pro Thr Gly Gly
     370                 375                 380
Pro Arg Gly Arg Leu Asn Gly Thr Gly Gly Pro Arg Glu Cys Asn Ser
385                 390                 395                 400
Phe Leu Arg His Ala Arg Glu Thr Pro Asp Ser Tyr Arg Asp Ser Pro
                 405                 410                 415
His Ser Glu Arg Tyr Val Ser Ala Met Thr Thr Pro Ala Arg Met Ser
             420                 425                 430
Pro Val Asp Phe His Thr Pro Ser Ser Pro Lys Ser Pro Pro Ser Glu
         435                 440                 445
Met Ser Pro Pro Val Ser Ser Met Thr Val Ser Lys Pro Ser Met Ala
     450                 455                 460
Val Ser Pro Phe Met Glu Glu Glu Arg Pro Leu Leu Leu Val Thr Pro
465                 470                 475                 480
Pro Arg Leu Arg Glu Lys Lys Phe Asp His His Pro Gln Gln Phe Ser
                 485                 490                 495
Ser Phe His His Asn Pro Ala His Asp Ser Asn Ser Leu Pro Ala Ser
             500                 505                 510
Pro Leu Arg Ile Val Glu Asp Glu Glu Tyr Glu Thr Thr Gln Glu Tyr
         515                 520                 525
Glu Pro Ala Gln Glu Pro Val Lys Lys Leu Ala Asn Ser Arg Arg Ala
     530                 535                 540
Lys Arg Thr Lys Pro Asn Gly His Ile Ala Asn Arg Leu Glu Val Asp
545                 550                 555                 560
Ser Asn Thr Ser Ser Gln Ser Ser Asn Ser Glu Ser Glu Thr Glu Asp
                 565                 570                 575
Glu Arg Val Gly Glu Asp Thr Pro Phe Leu Gly Ile Gln Asn Pro Leu
             580                 585                 590
Ala Ala Ser Leu Glu Ala Thr Pro Ala Phe Arg Leu Ala Asp Ser Arg
         595                 600                 605
```

```
Thr Asn Pro Ala Gly Arg Phe Ser Thr Gln Glu Glu Ile Gln Ala Arg
    610                 615                 620
Leu Ser Ser Val Ile Ala Asn Gln Asp Pro Ile Ala Val
625                 630                 635


<210> 6
<211> 2460
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (461)...(2371)

<400> 6
gtggctgcgg ggcaattgaa aaagagccgg cgaggagttc cccgaaactt gttggaactc 60
cgggctcgcg cggaggccag gagctgagcg gcggcggctg ccggacgatg ggagcgtgag 120
caggacggtg ataacctctc cccgatcggg ttgcgagggc gccgggcaga ggccaggacg 180
cgagccgcca gcggcgggac ccatcgacga cttcccgggg cgacaggagc agccccgaga 240
gccagggcga gcgcccgttc caggtggccg gaccgcccgc cgcgtccgcg ccgcgctccc 300
tgcaggcaac gggagacgcc cccgcgcagc gcgagcgcct cagcgcggcc gctcgctctc 360
cccatcgagg gacaaacttt tcccaaaccc gatccgagcc cttggaccaa actcgcctgc 420
gccgagagcc gtccgcgtag agcgctccgt ctccggcgag atg tcc gag cgc aaa   475
                                            Met Ser Glu Arg Lys
                                             1               5

gaa ggc aga ggc aaa ggg aag ggc aag aag aag gag cga ggc tcc ggc   523
Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys Glu Arg Gly Ser Gly
                10                  15                  20

aag aag ccg gag tcc gcg gcg ggc agc cag agc cca gcc ttg cct ccc   571
Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser Pro Ala Leu Pro Pro
            25                  30                  35

caa ttg aaa gag atg aaa agc cag gaa tcg gct gca ggt tcc aaa cta   619
Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala Gly Ser Lys Leu
        40                  45                  50

gtc ctt cgg tgt gaa acc agt tct gaa tac tcc tct ctc aga ttc aag   667
Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser Leu Arg Phe Lys
    55                  60                  65

tgg ttc aag aat ggg aat gaa ttg aat cga aaa aac aaa cca caa aat   715
Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys Asn Lys Pro Gln Asn
70                  75                  80                  85

atc aag ata caa aaa aag cca ggg aag tca gaa ctt cgc att aac aaa   763
Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu Arg Ile Asn Lys
                90                  95                  100

gca tca ctg gct gat tct gga gag tat atg tgc aaa gtg atc agc aaa   811
Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys Val Ile Ser Lys
            105                 110                 115
```

```
tta gga aat gac agt gcc tct gcc aat atc acc atc gtg gaa tca aac   859
Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr Ile Val Glu Ser Asn
        120                 125                 130

gag atc atc act ggt atg cca gcc tca act gaa gga gca tat gtg tct   907
Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu Gly Ala Tyr Val Ser
    135                 140                 145

tca gag tct ccc att aga ata tca gta tcc aca gaa gga gca aat act   955
Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr Glu Gly Ala Asn Thr
150                 155                 160                 165

tct tca tct aca tct aca tcc acc act ggg aca agc cat ctt gta aaa   1003
Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser His Leu Val Lys
                170                 175                 180

tgt gcg gag aag gag aaa act ttc tgt gtg aat gga ggg gag tgc ttc   1051
Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn Gly Gly Glu Cys Phe
            185                 190                 195

atg gtg aaa gac ctt tca aac ccc tcg aga tac ttg tgc aag tgc cca   1099
Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr Leu Cys Lys Cys Pro
        200                 205                 210

aat gag ttt act ggt gat cgc tgc caa aac tac gta atg gcc agc ttc   1147
Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr Val Met Ala Ser Phe
    215                 220                 225

tac aag gcg gag gag ctg tac cag aag aga gtg ctg acc ata acc ggc   1195
Tyr Lys Ala Glu Glu Leu Tyr Gln Lys Arg Val Leu Thr Ile Thr Gly
230                 235                 240                 245

atc tgc atc gcc ctc ctt gtg gtc ggc atc atg tgt gtg gtg gcc tac   1243
Ile Cys Ile Ala Leu Leu Val Val Gly Ile Met Cys Val Val Ala Tyr
                250                 255                 260

tgc aaa acc aag aaa cag cgg aaa aag ctg cat gac cgt ctt cgg cag   1291
Cys Lys Thr Lys Lys Gln Arg Lys Lys Leu His Asp Arg Leu Arg Gln
            265                 270                 275

agc ctt cgg tct gaa cga aac aat atg atg aac att gcc aat ggg cct   1339
Ser Leu Arg Ser Glu Arg Asn Asn Met Met Asn Ile Ala Asn Gly Pro
        280                 285                 290

cac cat cct aac cca ccc ccc gag aat gtc cag ctg gtg aat caa tac   1387
His His Pro Asn Pro Pro Pro Glu Asn Val Gln Leu Val Asn Gln Tyr
    295                 300                 305

gta tct aaa aac gtc atc tcc agt gag cat att gtt gag aga gaa gca   1435
Val Ser Lys Asn Val Ile Ser Ser Glu His Ile Val Glu Arg Glu Ala
310                 315                 320                 325

gag aca tcc ttt tcc acc agt cac tat act tcc aca gcc cat cac tcc   1483
Glu Thr Ser Phe Ser Thr Ser His Tyr Thr Ser Thr Ala His His Ser
                330                 335                 340
```

```
act act gtc acc cag act cct agc cac agc tgg agc aac gga cac act   1531
Thr Thr Val Thr Gln Thr Pro Ser His Ser Trp Ser Asn Gly His Thr
            345                 350                 355

gaa agc atc ctt tcc gaa agc cac tct gta atc gtg atg tca tcc gta   1579
Glu Ser Ile Leu Ser Glu Ser His Ser Val Ile Val Met Ser Ser Val
        360                 365                 370

gaa aac agt agg cac agc agc cca act ggg ggc cca aga gga cgt ctt   1627
Glu Asn Ser Arg His Ser Ser Pro Thr Gly Gly Pro Arg Gly Arg Leu
    375                 380                 385

aat ggc aca gga ggc cct cgt gaa tgt aac agc ttc ctc agg cat gcc   1675
Asn Gly Thr Gly Gly Pro Arg Glu Cys Asn Ser Phe Leu Arg His Ala
390                 395                 400                 405

aga gaa acc cct gat tcc tac cga gac tct cct cat agt gaa agg tat   1723
Arg Glu Thr Pro Asp Ser Tyr Arg Asp Ser Pro His Ser Glu Arg Tyr
                410                 415                 420

gtg tca gcc atg acc acc ccg gct cgt atg tca cct gta gat ttc cac   1771
Val Ser Ala Met Thr Thr Pro Ala Arg Met Ser Pro Val Asp Phe His
            425                 430                 435

acg cca agc tcc ccc aaa tcg ccc cct tcg gaa atg tct cca ccc gtg   1819
Thr Pro Ser Ser Pro Lys Ser Pro Pro Ser Glu Met Ser Pro Pro Val
        440                 445                 450

tcc agc atg acg gtg tcc aag cct tcc atg gcg gtc agc ccc ttc atg   1867
Ser Ser Met Thr Val Ser Lys Pro Ser Met Ala Val Ser Pro Phe Met
    455                 460                 465

gaa gaa gag aga cct cta ctt ctc gtg aca cca cca agg ctg cgg gag   1915
Glu Glu Glu Arg Pro Leu Leu Leu Val Thr Pro Pro Arg Leu Arg Glu
470                 475                 480                 485

aag aag ttt gac cat cac cct cag cag ttc agc tcc ttc cac cac aac   1963
Lys Lys Phe Asp His His Pro Gln Gln Phe Ser Ser Phe His His Asn
                490                 495                 500

ccc gcg cat gac agt aac agc ctc cct gct agc ccc ttg agg ata gtg   2011
Pro Ala His Asp Ser Asn Ser Leu Pro Ala Ser Pro Leu Arg Ile Val
            505                 510                 515

gag gat gag gag tat gaa acg acc caa gag tac gag cca gcc caa gag   2059
Glu Asp Glu Glu Tyr Glu Thr Thr Gln Glu Tyr Glu Pro Ala Gln Glu
        520                 525                 530

cct gtt aag aaa ctc gcc aat agc cgg cgg gcc aaa aga acc aag ccc   2107
Pro Val Lys Lys Leu Ala Asn Ser Arg Arg Ala Lys Arg Thr Lys Pro
    535                 540                 545

aat ggc cac att gct aac aga ttg gaa gtg gac agc aac aca agc tcc   2155
Asn Gly His Ile Ala Asn Arg Leu Glu Val Asp Ser Asn Thr Ser Ser
```

```
550                 555                 560                 565

cag agc agt aac tca gag agt gaa aca gaa gat gaa aga gta ggt gaa   2203
Gln Ser Ser Asn Ser Glu Ser Glu Thr Glu Asp Glu Arg Val Gly Glu
                570                 575                 580

gat acg cct ttc ctg ggc ata cag aac ccc ctg gca gcc agt ctt gag   2251
Asp Thr Pro Phe Leu Gly Ile Gln Asn Pro Leu Ala Ala Ser Leu Glu
            585                 590                 595

gca aca cct gcc ttc cgc ctg gct gac agc agg act aac cca gca ggc   2299
Ala Thr Pro Ala Phe Arg Leu Ala Asp Ser Arg Thr Asn Pro Ala Gly
        600                 605                 610

cgc ttc tcg aca cag gaa gaa atc cag gcc agg ctg tct agt gta att   2347
Arg Phe Ser Thr Gln Glu Glu Ile Gln Ala Arg Leu Ser Ser Val Ile
    615                 620                 625

gct aac caa gac cct att gct gta taaaacctaa ataaacacat agattcacct  2401
Ala Asn Gln Asp Pro Ile Ala Val
630                 635

gtaaaacttt attttatata ataaagtatt ccaccttaaa ttaaacaatt tattttatt  2460
```

<210> 7
<211> 241
<212> PRT
<213> Homo sapiens

<400> 7

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Met Ser Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys
 1               5                  10                  15
Glu Arg Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser
            20                  25                  30
Pro Ala Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala
        35                  40                  45
Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser
    50                  55                  60
Ser Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys
65                  70                  75                  80
Asn Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu
                85                  90                  95
Leu Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys
            100                 105                 110
Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr
        115                 120                 125
Ile Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu
    130                 135                 140
Gly Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr
145                 150                 155                 160
Glu Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr
                165                 170                 175
Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn
            180                 185                 190
Gly Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr
```

```
        195                 200                 205
Leu Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr
    210                 215                 220
Val Met Ala Ser Phe Tyr Ser Thr Ser Thr Pro Phe Leu Ser Leu Pro
225                 230                 235                 240
Glu
```

<210> 8
<211> 1715
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (493)...(1215)

<400> 8

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gcgcctgcct ccaacctgcg ggcgggaggt gggtggctgc ggggcaattg aaaaagagcc 60
ggcgaggagt tccccgaaac ttgttggaac tccgggctcg cgcggaggcc aggagctgag 120
cggcggcggc tgccggacga tgggagcgtg agcaggacgg tgataacctc tccccgatcg 180
ggttgcgagg gcgccgggca gaggccagga cgcgagccgc cagcggcggg acccatcgac 240
gacttcccgg ggcgacagga gcagccccga gagccagggc gagcgcccgt tccaggtggc 300
cggaccgccc gccgcgtccg cgccgcgctc cctgcaggca acgggagacg cccccgcgca 360
gcgcgagcgc ctcagcgcgg ccgctcgctc tccccatcga gggacaaact tttcccaaac 420
ccgatccgag cccttggacc aaactcgcct gcgccgagag ccgtccgcgt agagcgctcc 480
gtctccggcg ag atg tcc gag cgc aaa gaa ggc aga ggc aaa ggg aag ggc 531
             Met Ser Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys Gly
              1               5                  10

aag aag aag gag cga ggc tcc ggc aag aag ccg gag tcc gcg gcg ggc   579
Lys Lys Lys Glu Arg Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala Gly
     15                  20                  25

agc cag agc cca gcc ttg cct ccc caa ttg aaa gag atg aaa agc cag   627
Ser Gln Ser Pro Ala Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln
 30                  35                  40                  45

gaa tcg gct gca ggt tcc aaa cta gtc ctt cgg tgt gaa acc agt tct   675
Glu Ser Ala Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser
                 50                  55                  60

gaa tac tcc tct ctc aga ttc aag tgg ttc aag aat ggg aat gaa ttg   723
Glu Tyr Ser Ser Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu
             65                  70                  75

aat cga aaa aac aaa cca caa aat atc aag ata caa aaa aag cca ggg   771
Asn Arg Lys Asn Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly
         80                  85                  90

aag tca gaa ctt cgc att aac aaa gca tca ctg gct gat tct gga gag   819
Lys Ser Glu Leu Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu
     95                  100                 105
```

```
tat atg tgc aaa gtg atc agc aaa tta gga aat gac agt gcc tct gcc   867
Tyr Met Cys Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala
110                 115                 120                 125

aat atc acc atc gtg gaa tca aac gag atc atc act ggt atg cca gcc   915
Asn Ile Thr Ile Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro Ala
                130                 135                 140

tca act gaa gga gca tat gtg tct tca gag tct ccc att aga ata tca   963
Ser Thr Glu Gly Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser
            145                 150                 155

gta tcc aca gaa gga gca aat act tct tca tct aca tct aca tcc acc   1011
Val Ser Thr Glu Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr
        160                 165                 170

act ggg aca agc cat ctt gta aaa tgt gcg gag aag gag aaa act ttc   1059
Thr Gly Thr Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe
    175                 180                 185

tgt gtg aat gga ggg gag tgc ttc atg gtg aaa gac ctt tca aac ccc   1107
Cys Val Asn Gly Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro
190                 195                 200                 205

tcg aga tac ttg tgc aag tgc cca aat gag ttt act ggt gat cgc tgc   1155
Ser Arg Tyr Leu Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys
                210                 215                 220

caa aac tac gta atg gcc agc ttc tac agt acg tcc act ccc ttt ctg   1203
Gln Asn Tyr Val Met Ala Ser Phe Tyr Ser Thr Ser Thr Pro Phe Leu
            225                 230                 235

tct ctg cct gaa taggagcatg ctcagttggt gctgctttct tgttgctgca       1255
Ser Leu Pro Glu
        240

tctcccctca gattccacct agagctagat gtgtcttacc agatctaata ttgactgcct 1315
ctgcctgtcg catgagaaca ttaacaaaag caattgtatt acttcctctg ttcgcgacta 1375
gttggctctg agatactaat aggtgtgtga ggctccggat gtttctggaa ttgatattga 1435
atgatgtgat acaaattgat agtcaatatc aagcagtgaa atatgataat aaaggcattt 1495
caaagtctca cttttattga taaaataaaa atcattctac tgaacagtcc atcttcttta 1555
tacaatgacc acatcctgaa aagggtgttg ctaagctgta accgatatgc acttgaaatg 1615
atggtaagtt aattttgatt cagaatgtgt tatttgtcac aaataaacat aataaaagga 1675
gttcagatgt ttttcttcat taaccaaaaa aaaaaaaaaa                       1715

<210> 9
<211> 420
<212> PRT
<213> Homo sapiens

<400> 9
Met Ser Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys Gly Lys Lys Lys
 1               5                  10                  15
Glu Arg Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala Gly Ser Gln Ser
            20                  25                  30
```

```
Pro Ala Leu Pro Pro Gln Leu Lys Glu Met Lys Ser Gln Glu Ser Ala
        35                  40                  45
Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser
    50                  55                  60
Ser Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys
65                  70                  75                  80
Asn Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu
                85                  90                  95
Leu Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys
            100                 105                 110
Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr
        115                 120                 125
Ile Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu
    130                 135                 140
Gly Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr
145                 150                 155                 160
Glu Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr
                165                 170                 175
Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn
            180                 185                 190
Gly Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr
        195                 200                 205
Leu Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr
    210                 215                 220
Val Met Ala Ser Phe Tyr Lys Ala Glu Glu Leu Tyr Gln Lys Arg Val
225                 230                 235                 240
Leu Thr Ile Thr Gly Ile Cys Ile Ala Leu Leu Val Val Gly Ile Met
                245                 250                 255
Cys Val Val Ala Tyr Cys Lys Thr Lys Lys Gln Arg Lys Lys Leu His
            260                 265                 270
Asp Arg Leu Arg Gln Ser Leu Arg Ser Glu Arg Asn Asn Met Met Asn
        275                 280                 285
Ile Ala Asn Gly Pro His His Pro Asn Pro Pro Pro Glu Asn Val Gln
    290                 295                 300
Leu Val Asn Gln Tyr Val Ser Lys Asn Val Ile Ser Ser Glu His Ile
305                 310                 315                 320
Val Glu Arg Glu Ala Glu Thr Ser Phe Ser Thr Ser His Tyr Thr Ser
                325                 330                 335
Thr Ala His His Ser Thr Thr Val Thr Gln Thr Pro Ser His Ser Trp
            340                 345                 350
Ser Asn Gly His Thr Glu Ser Ile Leu Ser Glu Ser His Ser Val Ile
        355                 360                 365
Val Met Ser Ser Val Glu Asn Ser Arg His Ser Ser Pro Thr Gly Gly
    370                 375                 380
Pro Arg Gly Arg Leu Asn Gly Thr Gly Gly Pro Arg Glu Cys Asn Ser
385                 390                 395                 400
Phe Leu Arg His Ala Arg Glu Thr Pro Asp Ser Tyr Arg Asp Ser Pro
                405                 410                 415
His Ser Glu Arg
            420
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<210> 10
<211> 2431
<212> DNA

<213> Homo sapiens

<220>
<221> CDS
<222> (496)...(1755)

<400> 10
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gaggcgcctg cctccaacct gcgggcggga ggtgggtggc tgcggggcaa ttgaaaaaga 60
gccggcgagg agttccccga aacttgttgg aactccgggc tcgcgcggag gccaggagct 120
gagcggcggc ggctgccgga cgatgggagc gtgagcagga cggtgataac ctctccccga 180
tcgggttgcg agggcgccgg gcagaggcca ggacgcgagc cgccagcggc gggacccatc 240
gacgacttcc cggggcgaca ggagcagccc cgagagccag ggcgagcgcc cgttccaggt 300
ggccggaccg cccgccgcgt ccgcgccgcg ctccctgcag gcaacgggag acgccccgc 360
gcagcgcgag cgcctcagcg cggccgctcg ctctccccat cgagggacaa acttttccca 420
aacccgatcc gagcccttgg accaaactcg cctgcgccga gagccgtccg cgtagagcgc 480
tccgtctccg gcgag atg tcc gag cgc aaa gaa ggc aga ggc aaa ggg aag  531
                Met Ser Glu Arg Lys Glu Gly Arg Gly Lys Gly Lys
                 1               5                  10

ggc aag aag aag gag cga ggc tcc ggc aag aag ccg gag tcc gcg gcg   579
Gly Lys Lys Lys Glu Arg Gly Ser Gly Lys Lys Pro Glu Ser Ala Ala
         15                  20                  25

ggc agc cag agc cca gcc ttg cct ccc caa ttg aaa gag atg aaa agc   627
Gly Ser Gln Ser Pro Ala Leu Pro Pro Gln Leu Lys Glu Met Lys Ser
     30                  35                  40

cag gaa tcg gct gca ggt tcc aaa cta gtc ctt cgg tgt gaa acc agt   675
Gln Glu Ser Ala Ala Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser
 45                  50                  55                  60

tct gaa tac tcc tct ctc aga ttc aag tgg ttc aag aat ggg aat gaa   723
Ser Glu Tyr Ser Ser Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu
                 65                  70                  75

ttg aat cga aaa aac aaa cca caa aat atc aag ata caa aaa aag cca   771
Leu Asn Arg Lys Asn Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro
             80                  85                  90

ggg aag tca gaa ctt cgc att aac aaa gca tca ctg gct gat tct gga   819
Gly Lys Ser Glu Leu Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly
         95                  100                 105

gag tat atg tgc aaa gtg atc agc aaa tta gga aat gac agt gcc tct   867
Glu Tyr Met Cys Lys Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser
    110                 115                 120

gcc aat atc acc atc gtg gaa tca aac gag atc atc act ggt atg cca   915
Ala Asn Ile Thr Ile Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro
125                 130                 135                 140

gcc tca act gaa gga gca tat gtg tct tca gag tct ccc att aga ata   963
Ala Ser Thr Glu Gly Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile
                145                 150                 155
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tca gta tcc aca gaa gga gca aat act tct tca tct aca tct aca tcc   1011
Ser Val Ser Thr Glu Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser
            160                 165                 170

acc act ggg aca agc cat ctt gta aaa tgt gcg gag aag gag aaa act   1059
Thr Thr Gly Thr Ser His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr
        175                 180                 185

ttc tgt gtg aat gga ggg gag tgc ttc atg gtg aaa gac ctt tca aac   1107
Phe Cys Val Asn Gly Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn
    190                 195                 200

ccc tcg aga tac ttg tgc aag tgt cca aat gag ttt act ggt gat cgc   1155
Pro Ser Arg Tyr Leu Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg
205                 210                 215                 220

tgc caa aac tac gta atg gcc agc ttc tac aag gcg gag gag ctg tac   1203
Cys Gln Asn Tyr Val Met Ala Ser Phe Tyr Lys Ala Glu Glu Leu Tyr
                225                 230                 235

cag aag aga gtg ctg acc ata acc ggc atc tgc atc gcc ctc ctt gtg   1251
Gln Lys Arg Val Leu Thr Ile Thr Gly Ile Cys Ile Ala Leu Leu Val
            240                 245                 250

gtc ggc atc atg tgt gtg gtg gcc tac tgc aaa acc aag aaa cag cgg   1299
Val Gly Ile Met Cys Val Val Ala Tyr Cys Lys Thr Lys Lys Gln Arg
        255                 260                 265

aaa aag ctg cat gac cgt ctt cgg cag agc ctt cgg tct gaa cga aac   1347
Lys Lys Leu His Asp Arg Leu Arg Gln Ser Leu Arg Ser Glu Arg Asn
    270                 275                 280

aat atg atg aac att gcc aat ggg cct cac cat cct aac cca ccc ccc   1395
Asn Met Met Asn Ile Ala Asn Gly Pro His His Pro Asn Pro Pro Pro
285                 290                 295                 300

gag aat gtc cag ctg gtg aat caa tac gta tct aaa aac gtc atc tcc   1443
Glu Asn Val Gln Leu Val Asn Gln Tyr Val Ser Lys Asn Val Ile Ser
                305                 310                 315

agt gag cat att gtt gag aga gaa gca gag aca tcc ttt tcc acc agt   1491
Ser Glu His Ile Val Glu Arg Glu Ala Glu Thr Ser Phe Ser Thr Ser
            320                 325                 330

cac tat act tcc aca gcc cat cac tcc act act gtc acc cag act cct   1539
His Tyr Thr Ser Thr Ala His His Ser Thr Thr Val Thr Gln Thr Pro
        335                 340                 345

agc cac agc tgg agc aac gga cac act gaa agc atc ctt tcc gaa agc   1587
Ser His Ser Trp Ser Asn Gly His Thr Glu Ser Ile Leu Ser Glu Ser
    350                 355                 360

cac tct gta atc gtg atg tca tcc gta gaa aac agt agg cac agc agc   1635
His Ser Val Ile Val Met Ser Ser Val Glu Asn Ser Arg His Ser Ser
365                 370                 375                 380
```

```
cca act ggg ggc cca aga gga cgt ctt aat ggc aca gga ggc cct cgt   1683
Pro Thr Gly Gly Pro Arg Gly Arg Leu Asn Gly Thr Gly Gly Pro Arg
                385                 390                 395

gaa tgt aac agc ttc ctc agg cat gcc aga gaa acc cct gat tcc tac   1731
Glu Cys Asn Ser Phe Leu Arg His Ala Arg Glu Thr Pro Asp Ser Tyr
            400                 405                 410

cga gac tct cct cat agt gaa agg taaaaccgaa ggcaaagcta ctgcagagga  1785
Arg Asp Ser Pro His Ser Glu Arg
        415                 420

gaaactcagt cagagaatcc ctgtgagcac ctgcggtctc acctcaggaa atctactcta 1845
atcagaataa ggggcggcag ttacctgttc taggagtgct cctagttgat gaagtcatct 1905
ctttgtttga cggaacttat ttcttctgag cttctctcgt cgtcccagtg actgacaggc 1965
aacagactct taaagagctg ggatgctttg atgcggaagg tgcagcacat ggagtttcca 2025
gctctggcca tgggctcaga cccactcggg gtctcagtgt cctcagttgt aacattagag 2085
agatggcatc aatgcttgat aaggaccctt ctataattcc aattgccagt tatccaaact 2145
ctgattcggt ggtcgagctg gcctcgtgtt cttatctgct aaccctgtct taccttccag 2205
cctcagttaa gtcaaatcaa gggctatgtc attgctgaat gtcatggggg gcaactgctt 2265
gccctccacc ctatagtatc tattttatga aattccaaga agggatgaat aaataaatct 2325
cttggatgct gcgtctggca gtcttcacgg gtggttttca aagcagaaaa aaaaaaaaaa 2385
aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaaaaaa aaaaaa                2431

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<213> Homo sapiens

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Met Asp Val Lys Glu Arg Lys Pro Tyr Arg Ser Leu Thr Arg Arg Arg
 1               5                  10                  15
Asp Ala Glu Arg Arg Tyr Thr Ser Ser Ser Ala Asp Ser Glu Glu Gly
            20                  25                  30
Lys Ala Pro Gln Lys Ser Tyr Ser Ser Ser Glu Thr Leu Lys Ala Tyr
        35                  40                  45
Asp Gln Asp Ala Arg Leu Ala Tyr Gly Ser Arg Val Lys Asp Ile Val
    50                  55                  60
Pro Gln Glu Ala Glu Glu Phe Cys Arg Thr Gly Ala Asn Phe Thr Leu
65                  70                  75                  80
Arg Glu Leu Gly Leu Glu Glu Val Thr Pro Pro His Gly Thr Leu Tyr
                85                  90                  95
Arg Thr Asp Ile Gly Leu Pro His Cys Gly Tyr Ser Met Gly Ala Gly
            100                 105                 110
Ser Asp Ala Asp Met Glu Ala Asp Thr Val Leu Ser Pro Glu His Pro
        115                 120                 125
Val Arg Leu Trp Gly Arg Ser Thr Arg Ser Gly Arg Ser Ser Cys Leu
    130                 135                 140
Ser Ser Arg Ala Asn Ser Asn Leu Thr Leu Thr Asp Thr Glu His Glu
145                 150                 155                 160
Asn Thr Glu Thr Asp His Pro Gly Gly Leu Gln Asn His Ala Arg Leu
                165                 170                 175
Arg Thr Pro Pro Pro Pro Leu Ser His Ala His Thr Pro Asn Gln His
            180                 185                 190
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His Ala Ala Ser Ile Asn Ser Leu Asn Arg Gly Asn Phe Thr Pro Arg
        195                 200                 205
Ser Asn Pro Ser Pro Ala Pro Thr Asp His Ser Leu Ser Gly Glu Pro
    210                 215                 220
Pro Ala Gly Gly Ala Gln Glu Pro Ala His Ala Gln Glu Asn Trp Leu
225                 230                 235                 240
Leu Asn Ser Asn Ile Pro Leu Glu Thr Arg Asn Leu Gly Lys Gln Pro
                245                 250                 255
Phe Leu Gly Thr Leu Gln Asp Asn Leu Ile Glu Met Asp Ile Leu Gly
            260                 265                 270
Ala Ser Arg His Asp Gly Ala Tyr Ser Asp Gly His Phe Leu Phe Lys
        275                 280                 285
Pro Gly Gly Thr Ser Pro Leu Phe Cys Thr Thr Ser Pro Gly Tyr Pro
    290                 295                 300
Leu Thr Ser Ser Thr Val Tyr Ser Pro Pro Pro Arg Pro Leu Pro Arg
305                 310                 315                 320
Ser Thr Phe Ala Arg Pro Ala Phe Asn Leu Lys Lys Pro Ser Lys Tyr
                325                 330                 335
Cys Asn Trp Lys Cys Ala Ala Leu Ser Ala Ile Val Ile Ser Ala Thr
            340                 345                 350
Leu Val Ile Leu Leu Ala Tyr Phe Val Ala Met His Leu Phe Gly Leu
        355                 360                 365
Asn Trp His Leu Gln Pro Met Glu Gly Gln Met Tyr Glu Ile Thr Glu
    370                 375                 380
Asp Thr Ala Ser Ser Trp Pro Val Pro Thr Asp Val Ser Leu Tyr Pro
385                 390                 395                 400
Ser Gly Gly Thr Gly Leu Glu Thr Pro Asp Arg Lys Gly Lys Gly Thr
                405                 410                 415
Thr Glu Gly Lys Pro Ser Ser Phe Phe Pro Glu Asp Ser Phe Ile Asp
            420                 425                 430
Ser Gly Glu Ile Asp Val Gly Arg Arg Ala Ser Gln Lys Ile Pro Pro
        435                 440                 445
Gly Thr Phe Trp Arg Ser Gln Val Phe Ile Asp His Pro Val His Leu
    450                 455                 460
Lys Phe Asn Val Ser Leu Gly Lys Ala Ala Leu Val Gly Ile Tyr Gly
465                 470                 475                 480
Arg Lys Gly Leu Pro Pro Ser His Thr Gln Phe Asp Phe Val Glu Leu
                485                 490                 495
Leu Asp Gly Arg Arg Leu Leu Thr Gln Glu Ala Arg Ser Leu Glu Gly
            500                 505                 510
Thr Pro Arg Gln Ser Arg Gly Thr Val Pro Pro Ser Ser His Glu Thr
        515                 520                 525
Gly Phe Ile Gln Tyr Leu Asp Ser Gly Ile Trp His Leu Ala Phe Tyr
    530                 535                 540
Asn Asp Gly Lys Glu Ser Glu Val Val Ser Phe Leu Thr Thr Ala Ile
545                 550                 555                 560
Ala Leu Pro Pro Arg Leu Lys Glu Met Lys Ser Gln Glu Ser Ala Ala
                565                 570                 575
Gly Ser Lys Leu Val Leu Arg Cys Glu Thr Ser Ser Glu Tyr Ser Ser
            580                 585                 590
Leu Arg Phe Lys Trp Phe Lys Asn Gly Asn Glu Leu Asn Arg Lys Asn
        595                 600                 605
Lys Pro Gln Asn Ile Lys Ile Gln Lys Lys Pro Gly Lys Ser Glu Leu
    610                 615                 620
Arg Ile Asn Lys Ala Ser Leu Ala Asp Ser Gly Glu Tyr Met Cys Lys
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625                 630                 635                 640
Val Ile Ser Lys Leu Gly Asn Asp Ser Ala Ser Ala Asn Ile Thr Ile
                645                 650                 655
Val Glu Ser Asn Glu Ile Ile Thr Gly Met Pro Ala Ser Thr Glu Gly
            660                 665                 670
Ala Tyr Val Ser Ser Glu Ser Pro Ile Arg Ile Ser Val Ser Thr Glu
        675                 680                 685
Gly Ala Asn Thr Ser Ser Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser
    690                 695                 700
His Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn Gly
705                 710                 715                 720
Gly Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr Leu
                725                 730                 735
Cys Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr Val
            740                 745                 750
Met Ala Ser Phe Tyr Ser Thr Ser Thr Pro Phe Leu Ser Leu Pro Glu
        755                 760                 765
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<213> Homo sapiens

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<221> CDS
<222> (334)...(2637)

<400> 12

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cacctccaga aaagatcccg caccatcctc caggatccaa tggccttgga gagagggctg 120
cagggcccac ggacattgct gactcttcag aacgtgctga catggagcca ggtagactga 180
aattatcatg tgtccaaatt aaaattgcat acttcaagga ttatttgaag gactattctt 240
agacccttt aagaagattt aaagaaaaac cactcggccc tgagtgcggc gaggaccctg 300
tttgtggatg tggaggagcg cgggccggag gcc atg gac gtg aag gag agg aag  354
                                    Met Asp Val Lys Glu Arg Lys
                                     1               5

cct tac cgc tcg ctg acc cgg cgc cgc gac gcc gag cgc cgc tac acc   402
Pro Tyr Arg Ser Leu Thr Arg Arg Arg Asp Ala Glu Arg Arg Tyr Thr
         10                  15                  20

agc tcg tcc gcg gac agc gag gag ggc aaa gcc ccg cag aaa tcg tac   450
Ser Ser Ser Ala Asp Ser Glu Glu Gly Lys Ala Pro Gln Lys Ser Tyr
     25                  30                  35

agc tcc agc gag acc ctg aag gcc tac gac cag gac gcc cgc cta gcc   498
Ser Ser Ser Glu Thr Leu Lys Ala Tyr Asp Gln Asp Ala Arg Leu Ala
 40                  45                  50                  55

tat ggc agc cgc gtc aag gac att gtg ccg cag gag gcc gag gaa ttc   546
Tyr Gly Ser Arg Val Lys Asp Ile Val Pro Gln Glu Ala Glu Glu Phe
                 60                  65                  70

tgc cgc aca ggt gcc aac ttc acc ctg cgg gag ctg ggg ctg gaa gaa   594
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Cys Arg Thr Gly Ala Asn Phe Thr Leu Arg Glu Leu Gly Leu Glu Glu
             75                  80                  85

gta acg ccc cct cac ggg acc ctg tac cgg aca gac att ggc ctc ccc   642
Val Thr Pro Pro His Gly Thr Leu Tyr Arg Thr Asp Ile Gly Leu Pro
         90                  95                 100

cac tgc ggc tac tcc atg ggg gct ggc tct gat gcc gac atg gag gct   690
His Cys Gly Tyr Ser Met Gly Ala Gly Ser Asp Ala Asp Met Glu Ala
    105                 110                 115

gac acg gtg ctg tcc cct gag cac ccc gtg cgt ctg tgg ggc cgg agc   738
Asp Thr Val Leu Ser Pro Glu His Pro Val Arg Leu Trp Gly Arg Ser
120                 125                 130                 135

aca cgg tca ggg cgc agc tcc tgc ctg tcc agc cgg gcc aat tcc aat   786
Thr Arg Ser Gly Arg Ser Ser Cys Leu Ser Ser Arg Ala Asn Ser Asn
                140                 145                 150

ctc aca ctc acc gac acc gag cat gaa aac act gag act gat cat ccg   834
Leu Thr Leu Thr Asp Thr Glu His Glu Asn Thr Glu Thr Asp His Pro
            155                 160                 165

ggc ggc ctg cag aac cac gcg cgg ctc cgg acg ccg ccg ccg ccg ctc   882
Gly Gly Leu Gln Asn His Ala Arg Leu Arg Thr Pro Pro Pro Pro Leu
        170                 175                 180

tcg cac gcc cac acc ccc aac cag cac cac gcg gcc tcc att aac tcc   930
Ser His Ala His Thr Pro Asn Gln His His Ala Ala Ser Ile Asn Ser
    185                 190                 195

ctg aac cgg ggc aac ttc acg ccg agg agc aac ccc agc ccg gcc ccc   978
Leu Asn Arg Gly Asn Phe Thr Pro Arg Ser Asn Pro Ser Pro Ala Pro
200                 205                 210                 215

acg gac cac tcg ctc tcc gga gag ccc cct gcc ggc ggc gcc cag gag   1026
Thr Asp His Ser Leu Ser Gly Glu Pro Pro Ala Gly Gly Ala Gln Glu
                220                 225                 230

cct gcc cac gcc cag gag aac tgg ctg ctc aac agc aac atc ccc ctg   1074
Pro Ala His Ala Gln Glu Asn Trp Leu Leu Asn Ser Asn Ile Pro Leu
            235                 240                 245

gag acc aga aac cta ggc aag cag cca ttc cta ggg aca ttg cag gac   1122
Glu Thr Arg Asn Leu Gly Lys Gln Pro Phe Leu Gly Thr Leu Gln Asp
        250                 255                 260

aac ctc att gag atg gac att ctc ggc gcc tcc cgc cat gat ggg gct   1170
Asn Leu Ile Glu Met Asp Ile Leu Gly Ala Ser Arg His Asp Gly Ala
    265                 270                 275

tac agt gac ggg cac ttc ctc ttc aag cct gga ggc acc tcc ccg ctc   1218
Tyr Ser Asp Gly His Phe Leu Phe Lys Pro Gly Gly Thr Ser Pro Leu
280                 285                 290                 295
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ttc tgc acc aca tca cca ggg tac cca ctg acg tcc agc aca gtg tac   1266
Phe Cys Thr Thr Ser Pro Gly Tyr Pro Leu Thr Ser Ser Thr Val Tyr
                300                 305                 310

tct cct ccg ccc cga ccc ctg ccc cgc agc acc ttc gcc cgg ccg gcc   1314
Ser Pro Pro Pro Arg Pro Leu Pro Arg Ser Thr Phe Ala Arg Pro Ala
            315                 320                 325

ttt aac ctc aag aag ccc tcc aag tac tgt aac tgg aag tgc gca gcc   1362
Phe Asn Leu Lys Lys Pro Ser Lys Tyr Cys Asn Trp Lys Cys Ala Ala
        330                 335                 340

ctg agc gcc atc gtc atc tca gcc act ctg gtc atc ctg ctg gca tac   1410
Leu Ser Ala Ile Val Ile Ser Ala Thr Leu Val Ile Leu Leu Ala Tyr
    345                 350                 355

ttt gtg gcc atg cac ctg ttt ggc cta aac tgg cac ctg cag ccg atg   1458
Phe Val Ala Met His Leu Phe Gly Leu Asn Trp His Leu Gln Pro Met
360                 365                 370                 375

gag ggg cag atg tat gag atc acg gag gac aca gcc agc agt tgg cct   1506
Glu Gly Gln Met Tyr Glu Ile Thr Glu Asp Thr Ala Ser Ser Trp Pro
                380                 385                 390

gtg cca acc gac gtc tcc cta tac ccc tca ggg ggc act ggc tta gag   1554
Val Pro Thr Asp Val Ser Leu Tyr Pro Ser Gly Gly Thr Gly Leu Glu
            395                 400                 405

acc cct gac agg aaa ggc aaa gga acc aca gaa gga aag ccc agt agt   1602
Thr Pro Asp Arg Lys Gly Lys Gly Thr Thr Glu Gly Lys Pro Ser Ser
        410                 415                 420

ttc ttt cca gag gac agt ttc ata gat tct gga gaa att gat gtg gga   1650
Phe Phe Pro Glu Asp Ser Phe Ile Asp Ser Gly Glu Ile Asp Val Gly
    425                 430                 435

agg cga gct tcc cag aag att cct cct ggc act ttc tgg aga tct caa   1698
Arg Arg Ala Ser Gln Lys Ile Pro Pro Gly Thr Phe Trp Arg Ser Gln
440                 445                 450                 455

gtg ttc ata gac cat cct gtg cat ctg aaa ttc aat gtg tct ctg gga   1746
Val Phe Ile Asp His Pro Val His Leu Lys Phe Asn Val Ser Leu Gly
                460                 465                 470

aag gca gcc ctg gtt ggc att tat ggc aga aaa ggc ctc cct cct tca   1794
Lys Ala Ala Leu Val Gly Ile Tyr Gly Arg Lys Gly Leu Pro Pro Ser
            475                 480                 485

cat aca cag ttt gac ttt gtg gag ctg ctg gat ggc agg agg ctc cta   1842
His Thr Gln Phe Asp Phe Val Glu Leu Leu Asp Gly Arg Arg Leu Leu
        490                 495                 500

acc cag gag gcg cgg agc cta gag ggg acc ccg cgc cag tct cgg gga   1890
Thr Gln Glu Ala Arg Ser Leu Glu Gly Thr Pro Arg Gln Ser Arg Gly
    505                 510                 515
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act gtg ccc ccc tcc agc cat gag aca ggc ttc atc cag tat ttg gat   1938
Thr Val Pro Pro Ser Ser His Glu Thr Gly Phe Ile Gln Tyr Leu Asp
520                 525                 530                 535

tca gga atc tgg cac ttg gct ttt tac aat gac gga aag gag tca gaa   1986
Ser Gly Ile Trp His Leu Ala Phe Tyr Asn Asp Gly Lys Glu Ser Glu
                540                 545                 550

gtg gtt tcc ttt ctc acc act gcc att gcc ttg cct ccc cga ttg aaa   2034
Val Val Ser Phe Leu Thr Thr Ala Ile Ala Leu Pro Pro Arg Leu Lys
            555                 560                 565

gag atg aaa agc cag gaa tcg gct gca ggt tcc aaa cta gtc ctt cgg   2082
Glu Met Lys Ser Gln Glu Ser Ala Ala Gly Ser Lys Leu Val Leu Arg
        570                 575                 580

tgt gaa acc agt tct gaa tac tcc tct ctc aga ttc aag tgg ttc aag   2130
Cys Glu Thr Ser Ser Glu Tyr Ser Ser Leu Arg Phe Lys Trp Phe Lys
    585                 590                 595

aat ggg aat gaa ttg aat cga aaa aac aaa cca caa aat atc aag ata   2178
Asn Gly Asn Glu Leu Asn Arg Lys Asn Lys Pro Gln Asn Ile Lys Ile
600                 605                 610                 615

caa aaa aag cca ggg aag tca gaa ctt cgc att aac aaa gca tca ctg   2226
Gln Lys Lys Pro Gly Lys Ser Glu Leu Arg Ile Asn Lys Ala Ser Leu
                620                 625                 630

gct gat tct gga gag tat atg tgc aaa gtg atc agc aaa tta gga aat   2274
Ala Asp Ser Gly Glu Tyr Met Cys Lys Val Ile Ser Lys Leu Gly Asn
            635                 640                 645

gac agt gcc tct gcc aat atc acc atc gtg gaa tca aac gag atc atc   2322
Asp Ser Ala Ser Ala Asn Ile Thr Ile Val Glu Ser Asn Glu Ile Ile
        650                 655                 660

act ggt atg cca gcc tca act gaa gga gca tat gtg tct tca gag tct   2370
Thr Gly Met Pro Ala Ser Thr Glu Gly Ala Tyr Val Ser Ser Glu Ser
    665                 670                 675

ccc att aga ata tca gta tcc aca gaa gga gca aat act tct tca tct   2418
Pro Ile Arg Ile Ser Val Ser Thr Glu Gly Ala Asn Thr Ser Ser Ser
680                 685                 690                 695

aca tct aca tcc acc act ggg aca agc cat ctt gta aaa tgt gcg gag   2466
Thr Ser Thr Ser Thr Thr Gly Thr Ser His Leu Val Lys Cys Ala Glu
                700                 705                 710

aag gag aaa act ttc tgt gtg aat gga ggg gag tgc ttc atg gtg aaa   2514
Lys Glu Lys Thr Phe Cys Val Asn Gly Gly Glu Cys Phe Met Val Lys
            715                 720                 725

gac ctt tca aac ccc tcg aga tac ttg tgc aag tgc cca aat gag ttt   2562
Asp Leu Ser Asn Pro Ser Arg Tyr Leu Cys Lys Cys Pro Asn Glu Phe
```

```
        730                 735                 740

act ggt gat cgc tgc caa aac tac gta atg gcc agc ttc tac agt acg   2610
Thr Gly Asp Arg Cys Gln Asn Tyr Val Met Ala Ser Phe Tyr Ser Thr
    745                 750                 755

tcc act ccc ttt ctg tct ctg cct gaa taggagcatg ctcagttggt         2657
Ser Thr Pro Phe Leu Ser Leu Pro Glu
760                 765

gctgctttct tgttgctgca tctcccctca gattccacct agagctagat gtgtcttacc 2717
agatctaata ttgactgcct ctgcctgtcg catgagaaca ttaacaaaag caattgtatt 2777
acttcctctg ttcgcgacta gttggctctg agatactaat aggtgtgtga ggctccggat 2837
gtttctggaa ttgatattga atgatgtgat acaaattgat agtcaatatc aagcagtgaa 2897
atatgataat aaaggcattt caaagtctca cttttattga taaaataaaa atcattctac 2957
tgaacagtcc atcttcttta tacaatgacc acatcctgaa aagggtgttg ctaagctgta 3017
accgatatgc acttgaaatg atggtaagtt aattttgatt cagaatgtgt tatttgtcac 3077
aaataaacat aataaaagga aaaaaaaaaa aaaa                              3111

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<212> DNA
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<222> (507)...(1394)

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tcctccttct gcttttactt ctcctgcatg acagttgttt tcttcatctg agcagacacc 120
agcttcagat gctcgaggtg agaaacatgc ctttcagttt gggctactgg tttacttaat 180
taatcagccg gcagctccgt cgatctattt tcgtccctgt cctcttgacg agcccgggat 240
ggtttggagt agcatttaaa agaactagaa aagtggccca gaaacagcag cttaaagaat 300
tattacgata tactttgatt ttgtagttgc taggagcttt tcttcccccc ttgcatcttt 360
ctgaactctt cttgatttta ataatggcct tggacttgga cgatttatcg atttcccccc 420
gtaagatgct gtatcatttg gttgggggggg cctctgcgtg gtaatggacc gtgagagcgg 480
ccaggccttc ttctggaggt gagccg atg gag att tat tcc cca gac atg tct  533
                          Met Glu Ile Tyr Ser Pro Asp Met Ser
                           1               5

gag gtc gcc gcc gag agg tcc tcc agc ccc tcc act cag ctg agt gca   581
Glu Val Ala Ala Glu Arg Ser Ser Ser Pro Ser Thr Gln Leu Ser Ala
 10                  15                  20                  25

gac cca tct ctt gat ggg ctt ccg gca gca gaa gac atg cca gag ccc   629
Asp Pro Ser Leu Asp Gly Leu Pro Ala Ala Glu Asp Met Pro Glu Pro
                30                  35                  40

cag act gaa gat ggg aga acc cct gga ctc gtg ggc ctg gcc gtg ccc   677
Gln Thr Glu Asp Gly Arg Thr Pro Gly Leu Val Gly Leu Ala Val Pro
            45                  50                  55

tgc tgt gcg tgc cta gaa gct gag cgc ctg aga ggt tgc ctc aac tca   725
Cys Cys Ala Cys Leu Glu Ala Glu Arg Leu Arg Gly Cys Leu Asn Ser
```

```
          60                  65                  70

gag aaa atc tgc att gtc ccc atc ctg gct tgc ctg gtc agc ctc tgc   773
Glu Lys Ile Cys Ile Val Pro Ile Leu Ala Cys Leu Val Ser Leu Cys
     75                  80                  85

ctc tgc atc gcc ggc ctc aag tgg gta ttt gtg gac aag atc ttt gaa   821
Leu Cys Ile Ala Gly Leu Lys Trp Val Phe Val Asp Lys Ile Phe Glu
 90                  95                 100                 105

tat gac tct cct act cac ctt gac cct ggg ggg tta ggc cag gac cct   869
Tyr Asp Ser Pro Thr His Leu Asp Pro Gly Gly Leu Gly Gln Asp Pro
                110                 115                 120

att att tct ctg gac gca act gct gcc tca gct gtg tgg gtg tcg tct   917
Ile Ile Ser Leu Asp Ala Thr Ala Ala Ser Ala Val Trp Val Ser Ser
            125                 130                 135

gag gca tac act tca cct gtc tct agg gct caa tct gaa agt gag gtt   965
Glu Ala Tyr Thr Ser Pro Val Ser Arg Ala Gln Ser Glu Ser Glu Val
        140                 145                 150

caa gtt aca gtg caa ggt gac aag gct gtt gtc tcc ttt gaa cca tca   1013
Gln Val Thr Val Gln Gly Asp Lys Ala Val Val Ser Phe Glu Pro Ser
    155                 160                 165

gcg gca ccg aca ccg aag aat cgt att ttt gcc ttt tct ttc ttg ccg   1061
Ala Ala Pro Thr Pro Lys Asn Arg Ile Phe Ala Phe Ser Phe Leu Pro
170                 175                 180                 185

tcc act gcg cca tcc ttc cct tca ccc acc cgg aac cct gag gtg aga   1109
Ser Thr Ala Pro Ser Phe Pro Ser Pro Thr Arg Asn Pro Glu Val Arg
                190                 195                 200

acg ccc aag tca gca act cag cca caa aca aca gaa act aat ctc caa   1157
Thr Pro Lys Ser Ala Thr Gln Pro Gln Thr Thr Glu Thr Asn Leu Gln
            205                 210                 215

act gct cct aaa ctt tct aca tct aca tcc acc act ggg aca agc cat   1205
Thr Ala Pro Lys Leu Ser Thr Ser Thr Ser Thr Thr Gly Thr Ser His
        220                 225                 230

ctt gta aaa tgt gcg gag aag gag aaa act ttc tgt gtg aat gga ggg   1253
Leu Val Lys Cys Ala Glu Lys Glu Lys Thr Phe Cys Val Asn Gly Gly
    235                 240                 245

gag tgc ttc atg gtg aaa gac ctt tca aac ccc tcg aga tac ttg tgc   1301
Glu Cys Phe Met Val Lys Asp Leu Ser Asn Pro Ser Arg Tyr Leu Cys
250                 255                 260                 265

aag tgc cca aat gag ttt act ggt gat cgc tgc caa aac tac gta atg   1349
Lys Cys Pro Asn Glu Phe Thr Gly Asp Arg Cys Gln Asn Tyr Val Met
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gcc agc ttc tac agt acg tcc act ccc ttt ctg tct ctg cct gaa       1394
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Ala Ser Phe Tyr Ser Thr Ser Thr Pro Phe Leu Ser Leu Pro Glu
            285                 290                 295

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            20                  25                  30
Pro Ala Ala Glu Asp Met Pro Glu Pro Gln Thr Glu Asp Gly Arg Thr
        35                  40                  45
Pro Gly Leu Val Gly Leu Ala Val Pro Cys Cys Ala Cys Leu Glu Ala
    50                  55                  60
Glu Arg Leu Arg Gly Cys Leu Asn Ser Glu Lys Ile Cys Ile Val Pro
65                  70                  75                  80
Ile Leu Ala Cys Leu Val Ser Leu Cys Leu Cys Ile Ala Gly Leu Lys
                85                  90                  95
Trp Val Phe Val Asp Lys Ile Phe Glu Tyr Asp Ser Pro Thr His Leu
            100                 105                 110
Asp Pro Gly Gly Leu Gly Gln Asp Pro Ile Ile Ser Leu Asp Ala Thr
        115                 120                 125
Ala Ala Ser Ala Val Trp Val Ser Ser Glu Ala Tyr Thr Ser Pro Val
    130                 135                 140
Ser Arg Ala Gln Ser Glu Ser Glu Val Gln Val Thr Val Gln Gly Asp
145                 150                 155                 160
Lys Ala Val Val Ser Phe Glu Pro Ser Ala Ala Pro Thr Pro Lys Asn
                165                 170                 175
Arg Ile Phe Ala Phe Ser Phe Leu Pro Ser Thr Ala Pro Ser Phe Pro
            180                 185                 190
Ser Pro Thr Arg Asn Pro Glu Val Arg Thr Pro Lys Ser Ala Thr Gln
        195                 200                 205
Pro Gln Thr Thr Glu Thr Asn Leu Gln Thr Ala Pro Lys Leu Ser Thr
    210                 215                 220
Ser Thr Ser Thr Thr Gly Thr Ser His Leu Val Lys Cys Ala Glu Lys
225                 230                 235                 240
Glu Lys Thr Phe Cys Val Asn Gly Gly Glu Cys Phe Met Val Lys Asp
                245                 250                 255
Leu Ser Asn Pro Ser Arg Tyr Leu Cys Lys Cys Pro Asn Glu Phe Thr
            260                 265                 270
Gly Asp Arg Cys Gln Asn Tyr Val Met Ala Ser Phe Tyr Ser Thr Ser
        275                 280                 285
Thr Pro Phe Leu Ser Leu Pro Glu
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290 295